

RD&T Today

From research to reality

RESEARCH - DEVELOPMENT - TECHNOLOGY TRANSFER

Wisconsin Department of Transportation

June 2000

WisDOT retooling research for the future

Recognizing the tremendous value of research when it comes to developing new transportation-related products and services, the Wisconsin Department of Transportation (WisDOT) launched a reorganization of its research efforts in 1998.

Step one of the reorganization, shown in Figure 1, is a partnership with the Federal Highway Administration (FHWA), private-sector businesses and state universities. Under this arrangement, department research efforts that utilize State Planning and Research (SPR) funds are handled by two multi-partnered groups—the Wisconsin Highway Research Program (WHRP) and the Council on Research (COR).

- *Overall direction* to both WHRP and COR is provided by WisDOT.

- Administration of *highway-related* research through WHRP is handled by the UW-Madison's College of Engineering through an interagency agreement.
- Administration of *other research*, such as policy studies, operational improvements, technology development, ITS enhancement and safety is handled within WisDOT via COR.
- *Coordination and financial management* of both WHRP and COR programs are carried out by the Research Coordination Section in the Division of Transportation Infrastructure Development.

Step two of the department's reorganization of its research

efforts will be creation of a dynamic public-private entity called the Wisconsin Transportation Research Center (WTRC) to carry out research, development and technology transfer (RD&T) in all segments of Wisconsin transportation, encompassing both highway and other modal areas, along with policy, planning, safety, etc.

The institutional framework for the Center is now under consideration by WisDOT and its partners in industry and academia.


Successful models from other states, universities and industry foundations will be evaluated for components that will be a fit for Wisconsin. The goal is to create a responsive, accountable research organization to meet the diverse needs of the state. 

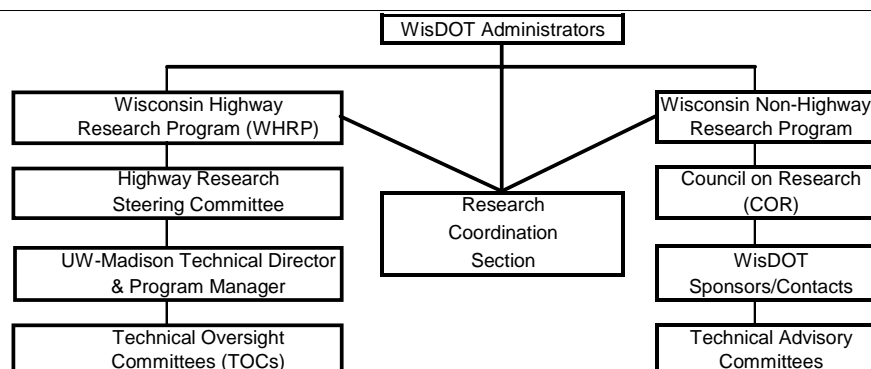
Figure 1

Strategic Leadership

Policy Direction

Research Administration

Technical Input/Review



RD&T Today



RD&T Today is published by the Research Coordination Section, Division

of Transportation Infrastructure Development, Wisconsin Department of Transportation.

Our goals include helping identify needed transportation research not previously carried out by others, monitoring research in progress and facilitating implementation of results into practice.

This three-step process of Research, Development and Technology Transfer (RD&T) is at the core of all our activities.

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WisDOT Research Coordination Section

Nina McLawhorn

WisDOT Research Administrator

Change is *always* good, a friend of mine once told me. I'd agree...and add that it's *never* easy.

The transportation industry, like every sector of our economy, is being pressed hard to change. Our customers—the traveling (and paying) public, business users of our systems, as well as our partners in design and construction—are all asking for change in the way WisDOT does business.

Of course, they're often advocating different, sometimes conflicting, changes.

As Research Administrator for the Department, I have the exciting task of joining with other transportation professionals from WisDOT, FHWA, industry and state universities, not only to look into the future, but also to help make it happen, hopefully in ways that successfully balance competing interests.

That's how I view research—envisioning better ways to do our jobs for our customers, testing out our best ideas, then putting into practice the ones that work, that make for better processes and products while saving time and money.

In this first quarterly issue of *RD&T Today*, a newsletter of WisDOT's Research Coordination Section, we survey the recent, significant *changes* in the department's research programs and preview more to come.

I invite you to look closely at what we're doing and let us know what you think. 🦋

Nina

Wisconsin's Transportation systems include:

- 110,000 miles of roads
- 13,000 bridges
- 68 bus and taxi systems
- 131 airports
- 12 railroads
- 15 ports

WHRP off to a running start

Now into its second year, the Wisconsin Highway Research Program (WHRP) is directing its efforts into four key areas—flexible highway pavements, rigid pavements, geotechnics and structures.

There are currently four standing Technical Oversight Committees (TOCs), each chaired by a WisDOT employee. Other committee members include technical specialists from industry, academia and the FHWA Wisconsin Division.

TOCs identify pressing problems that need to be solved or potential new technologies and practices that need to be proven under controlled conditions.


Committee members develop formal statements of the problem with input from their constituencies and then issue public requests for research proposals (RFPs).

The TOCs review responses to the RFPs, rank them and recommend the top ones to the WHRP Steering Committee (shown in photo at right) for funding.

In its first year of responsibility for administering highway-related research for the department, the WHRP and its TOCs initiated 12 projects for FFY 2000 and assumed responsibility for four FFY 1999 projects which had not yet been contracted.

Most recently, at its May 19, 2000 meeting, the WHRP Steering Committee initiated six new

research projects for FFY 2001, bringing to 22 the total number of highway projects being administered by the new group.

Project titles and funding for these and other projects coordinated by the Research Section are listed on page 6. 



Peter Bosscher
WHRP Technical Director

TOC Chairs

- Len Makowski,
Flexible Pavement
- Dave Larson,
Rigid Pavement
- Bob Arndorfer,
Geotechnics
- Stan Woods,
Structures



WHRP Steering Committee (left to right)

Mark Chandler, FHWA, representing **Dwight McComb**
Jim Gruendler, WisDOT Division of Infrastructure Development
Dave Kuemmel, Marquette University
Ernie Wittwer, WisDOT Division of Investment Management
Tom Walker, Wisconsin Transportation Builders Association
Gerald Waelti, Wisconsin Asphalt Pavers Association

Missing from the photo are:

Kevin McMullen, Wisconsin Concrete Pavers Association
Mike Paddock, Wisconsin Association of Consulting Engineers

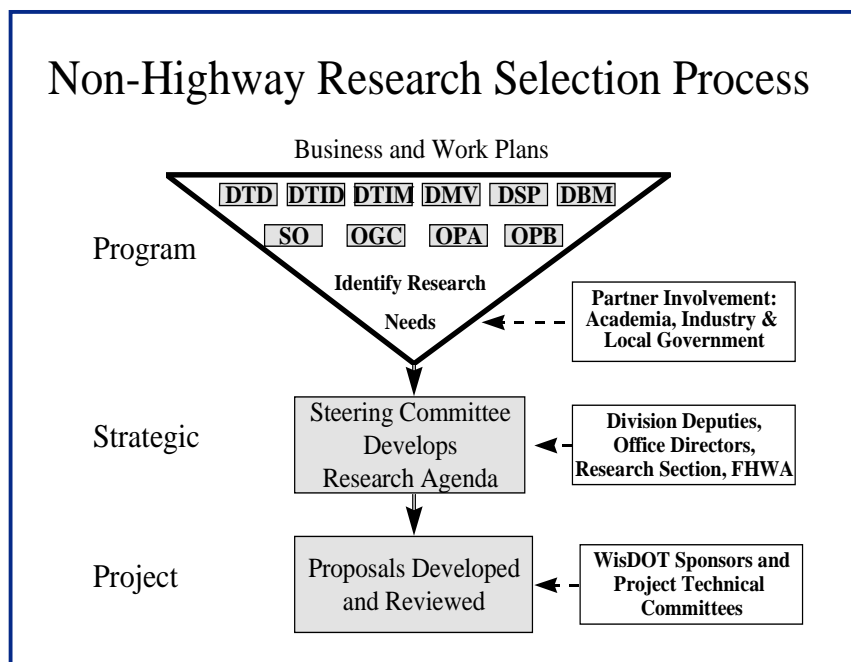
Council on Research forming strategic research agenda

WisDOT's Council on Research (COR) launched a new process in April 2000 for identifying non-highway (policy/systems) research projects to be funded for Federal Fiscal Year 2001.


The goal of this change, outlined in the chart to the right, is to more closely align the research program to the strategic needs of the Department.

Each division and office of the Department, every bureau and section has been asked to think about *what they don't know*...but need to know...in order to achieve their strategic plan and meet customer needs in the future.

Currently, staff from the Research Coordination Section, in cooperation with WisDOT



technical contacts and sponsors, are directly overseeing ten open research projects approved through previous Council on

Research processes. Titles and funding for these and other projects are listed on the table on page 6. 


Information services—the changing role of transportation libraries

WisDOT's libraries and their evolving information services are integral and critical components of Wisconsin's overall research program, helping to maximize the **value of information**, which can be measured in terms of:

- Reduced costs of agency research, technology development and operations;
- Quicker implementation of innovations and time savings;

- More effective decision making at all levels of the agency.

The 8th floor Central Office Library at Hill Farms, maintained by John Cherney (608-266-0724), and the Research Library at Truax, maintained by Minhua Li (608-243-5989), are only two of several Department libraries serving WisDOT staff as well as university researchers, contractors, consultants and the public.

In addition to providing access to in-house collections of research reports, journals and other periodicals, our transportation librarians can utilize Internet searches (and show you how to use them) to track down information on every aspect of transportation. They can help you borrow books, reports and journal articles from almost any library in Wisconsin and from many across the country. 

University Transportation Center gets go-ahead from USDOT

On April 17, 2000, the U.S. Department of Transportation (USDOT) approved our region's plan for the Midwest University Transportation Center (UTC). The plan, strongly supported by WisDOT, was submitted by a consortium of eight universities:

- University of Wisconsin – Madison (lead institution)
- University of Chicago
- University of Cincinnati
- Lac Courte Oreilles Ojibwa Community College
- Marquette University
- University of Wisconsin – Milwaukee
- Northwestern University
- Richard Daley College

Wisconsin and the other states in the region (Illinois, Indiana, Michigan, Minnesota and Ohio) now have a unique opportunity to


leverage nearly \$5 million in federal dollars with regional transportation resources to meet shared challenges in the important area of asset management.

The new UTC will bring to bear the considerable expertise of the region's faculties—in the schools of engineering, planning, business, public policy, economics and communications—on the urgent needs of our agencies. The UTC Strategic Plan stakes out its mission in terms of:

- *Education* of present and future transportation professionals;
- Focused *research* on asset management issues, including multi-modal tradeoffs;
- Practical *transfer of technology* to state and local practitioners.



Jeffrey Russell
UTC Director

In the coming months, WisDOT Secretary Terrence Mulcahy will be working with UTC Director Jeffrey Russell, UW-Madison, to establish an Executive Committee, Advisory Committee and Technical Oversight Committees that will guide the UTC's operations. 

Technology Advancement Unit defining its new role


With the creation of the Wisconsin Highway Research Program in 1998, WisDOT's Pavement Research Unit changed its name to the Technology Advancement Unit (TAU) to clarify its new role.

Now headed by Dave Larson, the Unit is part of the Pavements Section of the Bureau of Highway Construction, Division of Transportation Infrastructure Development. TAU staff members are located at the Truax Center on Kinsman

Boulevard in Madison, along with the Bureau's Sections of Quality Management, Geotechnical and Standards Development.

The mission of TAU is "to support the WisDOT Strategic Directions by addressing both existing and anticipated future needs of Wisconsin's transportation system by conducting pavement studies and evaluations, and investigating and applying state-of-the-art technology."

To accomplish its mission, TAU participates in a wide range of national and regional initiatives. Two examples of their current work—on dowel bar retrofits and erosion control—are included as an insert with this issue of *RD&T Today*.

Open research projects still under the technical administration of TAU are listed in the table on page 6 along with other WisDOT research projects. 

WisDOT Open Research Projects¹ - June 2000

		Research Project	Fiscal Year	Contract Amount
W	Flexible Pavement	Laboratory and Field Evaluation of SuperPave Mix Designs	1998	\$80,001
		Minimum Pavement Thickness for Superpave Mixes	2000	\$25,435
		Rational Overlay Design Procedures for Flexible Pavements	2000	\$45,000
		Temperature-Density Relationship of Hot-Mix Asphalt	2000	\$50,000
		Guidelines for Selection of Performance-Graded Binders for Asphalt	2001	\$100,000 ²
		Gyratory Compactor to Measure Mechanical Stability of Asphalt Mixes	2001	\$55,000 ²
		HMA Moisture Damage as it Relates to Pavement Performance	2001	\$51,000 ²
H	Rigid Pavement	Field Measurement of Water-Cement Ratio for PCC - II	1999	\$55,510
		Effects of Aggregate Coatings and Films on Concrete Performance	2000	\$97,740
		Wet Pavements Accident Study of Tined PCC Pavements	2000	\$75,000
		PCC Pavements over Rubblized PCC Pavements	2000	\$39,857
		Early Opening of PCC Pavements to Traffic	2001	\$60,000 ²
R	Geotechnics	Geosynthetics in Stabilizing Soft Subgrade with Breaker Run	1999	\$55,000
		Field Demonstration Foundry Sand as Sub-Base Material	1999	\$95,000
		Equivalency of Subgrade Reinforcement Methods	2000	\$100,616
		Investigation of Bridge Approach Settlements	2000	\$99,979
		Estimating Pile Setup	2000	\$30,035 ²
		Evaluation of Dynamic Cone Penetrometer and Soil Stiffness Gauge	2001	\$58,803 ²
P	Structures	Non-Destructive Testing of Highway Bridge Structures for Evaluation	2000	\$49,745
		Structural Analysis of Sign Bridge Structures and Luminaire Supports	2000	\$49,969
		Assessment and Rehabilitation Guidelines for Concrete Structures	2000	\$50,000
		Rehabilitation Techniques for Concrete Bridges	2001	\$124,967 ²
		Total		\$1,448,657
C O R		Impacts of a Sweeping Program on Storm Water Runoff	1997	\$130,000
		Pilot Archeological Database	1998	\$53,060
		Licensing the High-Risk Driver	1999	\$90,000 ²
		Benefits of Variable Message Signs and Highway Advisory Radio	1999	\$150,000 ²
		Automation of Route and Bridge Permitting	1999	\$90,000
		Benefits of ITS Deployment in Wisconsin	1999	\$40,000
		Economic and Land Use Goals in Transportation Investments	2000	\$180,000
		Use of the Inspection Selection System for Motor Carrier Safety	2000	\$40,000
		Evaluation of Storm Water Treatment Technologies for Highway Runoff	2000	\$75,000 ²
		Implementation Issues for Automatic Vehicle Locator Systems	2000	\$190,000
		Total		\$1,038,060³
T A U		Evaluation of Stone Matrix Asphalt	1991	\$90,000
		Effects of Grinding on Portland Cement Concrete (PCC) Pavements	1992	\$195,137
		Recycling Asphaltic Pavement Containing Tire Rubber	1993	\$21,000
		Impacts Related to Pavement Texture Selection - Phase II	1993	\$377,809
		Modified Asphalt Performance Using SHRP Binder Specifications	1994	\$87,000
		Enhancing Freeze-Thaw Durability of PCC Pavements	1995	\$113,370
		Cost-Effective Concrete Pavement Cross Sections	1995	\$187,180
		Performance-Based Specifications for Bridge Decks	1995	\$60,000
		Layer Coefficients for New and Reprocessed Asphaltic Mixes	1997	\$51,808
		Comprehensive Subgrade Deflection Acceptance Criteria	1998	\$159,900
		Investigative Study of the Italgrip System - Noise Analysis	1999	\$125,000
		Total		\$1,468,204

Notes: (1) Pooled funds, grants and gifts are not included. (2) Estimates. Final contract amounts to be determined. (3) COR projects for FFY 2001 will be awarded by 9/1/2000. (4) Approximately 14 projects have been completed since 7/1/99.

Customer survey highlights importance of communication, practicality

The Research Coordination Section recently invited more than 200 of our customers to tell us their views on Wisconsin transportation research, development and technology transfer. Figure 1 shows that of the 80 people who responded to the survey (68% from WisDOT and 9% each from construction, consulting engineering and academia), a majority place a high value on RD&T both for their own jobs and for their organizations.

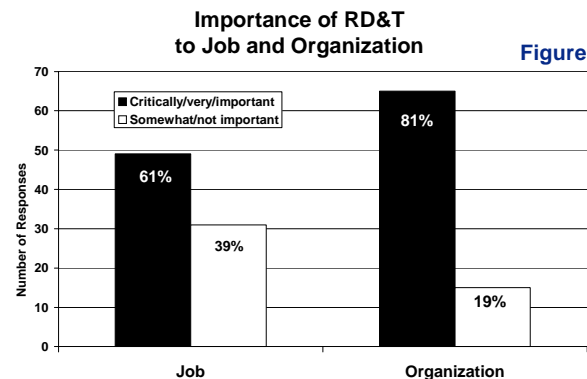
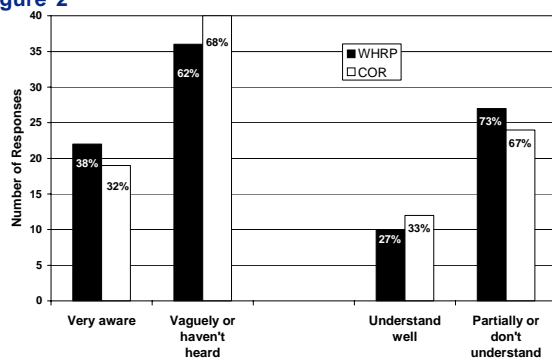


Figure 1

Figure 2 Awareness/Understanding of WHRP and COR



Regarding awareness and understanding of the newly created structures for research in the Department, Figure 2 clearly shows we need to reach out with more and better communication to the two-thirds of respondents (and others like them) who have little awareness or understanding of the new programs. This issue of *RD&T Today* is the first of many such communication efforts.

As for desired characteristics of research, shown in Figure 3, respondents were not as concerned about *who* does the research but strongly emphasized that it be practical—address current problems, have the potential to save time and money, and is communicated clearly to users, completed on time and put into practice.

Research Characteristics

Figure 3

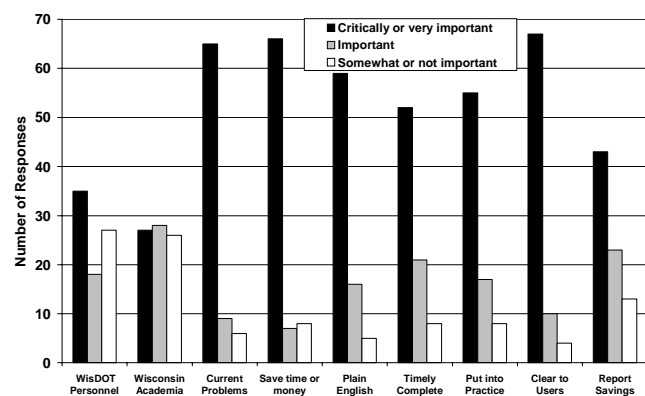
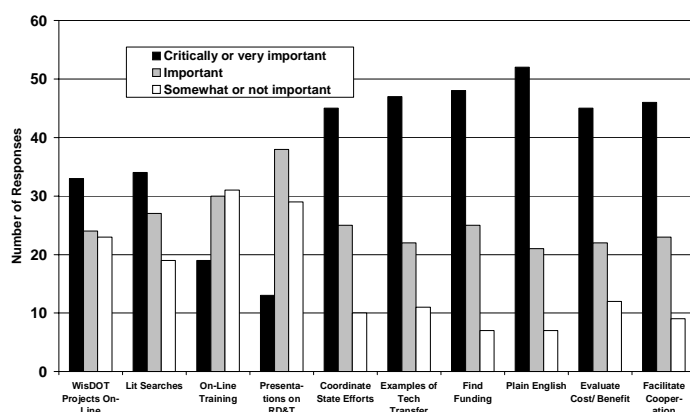


Figure 4 Research Program Services



In addition, as shown in Figure 4, respondents emphasized the importance of a *clear, coordinated and efficient program* that assures research results are summarized in plain English, secures sufficient funding, encourages cooperative state efforts and cites successful examples of technology transfer.

WisDOT District Offices voice opinions about research

During the month of April 2000, staff from the Research Coordination Section visited the eight WisDOT District Offices to update them on the Department's current RD&T programs and listen to their views about how research ought to be done. Here are some highlights of what the Districts had to say.

WisDOT Research Programs

"The information is not out there. You need a higher profile."

"If the Districts don't see a benefit to the program, they won't get involved."

"Jazz up your image. Keep it brief, interesting."

University Involvement

"Academics don't see the day-to-day requirements of construction, the dollars involved, keeping budgets in line. That's not their concern. But maybe we don't see what their needs and goals are. Maybe we need to swap roles for awhile."

"Has there been an evaluation of how it's worked? Has it helped

or has it taken us further away from the Districts and more into lab-oriented problems."

"Maybe they will bring more structure to the research process, more planning, more lead time."

Up-Front Planning

"We're reluctant to put in research by change order."

"Our work is primarily construction and reacting to problems. We don't have time for long-term research projects."

"There are many areas we could use research on: operations, weather, salt, traffic, snow and ice removal, raised pavement markers, changeable message boards, etc."

RD&T Coordination

"Research is fragmented, too many layers, not enough ownership and not enough doers."

"Three or four people in the department may be working on the same thing without knowing about the others."

"Research should all be under one roof, under one group of people."

"The real problem is keeping track of what all is out there. No one gets assigned to monitor it."

Follow-up/Documentation

"We collect a lot of data, but we don't see anything back; there's nothing done with it."

"If the champion retires or moves to another job, the project is forgotten."

"How do we capture what we've learned?"

Communication/Information

"We need access to data sets: safety, capacity, indexes of all kinds of data."

"We need better, more targeted search engines or just one source of information."

"Where can I find research information to use in putting out a press release?"

"We need clearer information, in some kind of tiered way so you only get as much detail as you want."

"Keep it brief, readable."

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